

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF

LIAU, et al.

APPLICATION NO: TBA

FILED: HERewith

FOR: INDUCTION OF BLOOD VESSEL FORMATION THROUGH  
ADMINISTRATION OF POLYNUCLEOTIDES ENCODING  
SPHINGOSINE KINASES

Art Unit:

Examiner:

Atty Docket No. 4-31617A

Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with 37 C.F.R. §1.56, applicant wishes to call the Examiner's attention to the references cited on the attached form(s) PTO-1449. Copies of these references are enclosed herewith.

Although these documents are made known to the Patent and Trademark Office in compliance with Applicant's duty of disclosure, such disclosure is not to be construed as an admission by Applicant or Applicant's representative that any of the references, single or in any combination thereof, is effective as prior art against the subject application. In accordance with 37 C.F.R. §1.97(h), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 C.F.R. §1.56(b) exists.

The Examiner is requested to consider the foregoing information in relation to this application and indicate that each reference was considered by returning a copy of the initialed PTO 1449 form(s).

Respectfully submitted,

Novartis  
Corporate Intellectual Property  
One Health Plaza, Building 430  
East Hanover, NJ 07936-1080  
(301) 258-4715

  
J. Timothy Meigs  
Attorney for Applicants  
Reg. No. 38,241

Date: July 14, 2003

FORM PTO-1449  
(REV. 7-85)U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE**INFORMATION DISCLOSURE CITATION**

(Use several sheets if necessary)

ATTY. DOCKET NO.  
4-31617A  
APPLICATION NO.  
TBA  
APPLICANT  
Liau, et al.  
FILING DATE  
June 24, 2003

Group

**U.S. PATENT DOCUMENTS**

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	AA						
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						

**FOREIGN PATENT DOCUMENTS**

		DOCUMENT NUMBER	DATE	OFFICE	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
	AM	WO 01/31029	5/3/01	WIPO			<input type="checkbox"/>	<input type="checkbox"/>
	AN	WO 01/60990	8/23/01	WIPO			<input type="checkbox"/>	<input type="checkbox"/>
	AO	WO 99/12533	3/18/99	WIPO			<input type="checkbox"/>	<input type="checkbox"/>
	AP	WO 99/61581	12/2/99	WIPO			<input type="checkbox"/>	<input type="checkbox"/>
	AQ	WO 00/70028	11/23/00	WIPO			<input type="checkbox"/>	<input type="checkbox"/>

**OTHER DOCUMENTS** (Including Author, Title, Date, Pertinent pages, Etc.)

	AR	Ancellin, et al., "Differential Pharmacological Properties and Signal Transduction of the Sphingosine 1-Phosphate Receptors EDG-1, EDG-3, and EDG-5;" <i>The Journal of Biological Chemistry</i> , 274(27):18997-19002 (July 2, 1999)
	AS	Ancellin, et al., "Extracellular Export of Sphingosine Kinase-1 Enzyme;" <i>The Journal of Biological Chemistry</i> , 277(8):6667-6675 (December 10, 2001)
	AT	Banno, et al., "Evidence for the Presence of Multiple Forms of Sph Kinase in Human Platelets," <i>J. Biochem.</i> , 335:301-304 (1998)

**EXAMINER****DATE CONSIDERED**

\*EXAMINER: Initial of reference considered, whether or not citation is in conformance with MPEP 609: Draw a line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.

## INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

ATTY. DOCKET NO.  
4-31617A  
APPLICATION NO.  
TBA  
APPLICANT  
Liau, et al.  
FILING DATE  
June 24, 2003

Group

## U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	AA						
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						

## FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	OFFICE	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
	AM						<input type="checkbox"/>	<input type="checkbox"/>
	AN						<input type="checkbox"/>	<input type="checkbox"/>
	AO						<input type="checkbox"/>	<input type="checkbox"/>
	AP						<input type="checkbox"/>	<input type="checkbox"/>
	AQ						<input type="checkbox"/>	<input type="checkbox"/>

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent pages, Etc.)

	AR	Boguslawski, et al., "Sphingosylphosphorylcholine Induces Endothelial Cell Migration and Morphogenesis," <i>Biochemical and Biophysical Research Communications</i> , 272:603-609 (June 7, 2000)
	AS	Bornfeldt, et al., "Sphingosine-1-Phosphate Inhibits PDGF-induced Chemotaxis of Human Arterial Smooth Muscle Cells: Spatial and Temporal Modulation of PDGF Chemotactic Signal Transduction," <i>The Journal of Cell Biology</i> , 130(1):193-206 (1995)
	AT	Edsall, et al., "Enzymatic Measurement of Sphingosine 1-Phosphate," <i>Analytical Biochemistry</i> , 272:80-86 (July 15, 1999)

EXAMINER

DATE CONSIDERED

\*EXAMINER: Initial of reference considered, whether or not citation is in conformance with MPEP 609: Draw a line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.

**INFORMATION DISCLOSURE CITATION**

(Use several sheets if necessary)

ATTY. DOCKET NO.  
4-31617A  
APPLICATION NO.  
TBA  
APPLICANT  
Liau, et al.  
FILING DATE  
June 24, 2003

Group

**OTHER DOCUMENTS** (Including Author, Title, Date, Pertinent pages, Etc.)

AA	English, et al., "Sphingosine 1-Phosphate Released from Platelets During Clotting Accounts for the Potent Endothelial Cell Chemotactic Activity of Blood Serum and Provides a Novel Link Between Hemostasis and Angiogenesis;" <i>The FASEB Journal</i> , 14:2255-2265 (November 2000)
AB	Enming, et al., "An Adenoviral Vector Expressing Sphingosine Kinase 1 Confers Enhanced Neovascularization;" <i>Scientific Conference on Therapeutic Angiogenesis and Myocardial Laser Revascularization</i> , January 24-27, 2001, Santa Fe, New Mexico, Abstract P58
AC	Fang, et al., "Lysophospholipid Growth Factors in the Initiation, Progression, Metastases, and Management of Ovarian Cancer;" <i>Ann NY Acad Sci</i> 2000, 905:188-208 (April 2000)
AD	Gibbs, et al., "Regulation of Expression of EDG Family Receptors in Human Prostate Cancer Cell Lines;" <i>Ann NY Acad Sci</i> 2000, 905:290-293 (April 2000)
AE	Goetzl, et al., "Diversity of Cellular Receptors and Functions for the Lysophospholipid Growth Factors Lysophosphatidic Acid and Sphingosine 1-Phosphate;" <i>The FASEB Journal</i> , 12:1589-1598 (December 1998)
AF	Hisano, et al., "Induction and Suppression of Endothelial Cell Apoptosis by Sphingolipids: A Possible In Vitro Model for Cell-Cell Interactions Between Platelets and Endothelial Cells;" <i>Blood</i> , 93(12):4293-4299 (June 15, 1999)
AG	Hla, et al., "An Abundant Transcript Induced in Differentiating Human Endothelial Cells Encodes a Polypeptide with Structural Similarities to G-protein-coupled Receptors;" <i>The Journal of Biological Chemistry</i> , 265(16):9308-9313 (June 5, 1990)
AH	Hla, et al., "Sphingosine-1-phosphate: Extracellular Mediator or Intracellular Second Messenger?" <i>Biochemical Pharmacology</i> , 58:201-207 (July 15, 1999)
AI	International Search Report for PCT/EP01/11513, dated April 25, 2002
AJ	Kohama, et al., "Molecular Cloning and Functional Characterization of Murine Sphingosine Kinase;" <i>The Journal of Biological Chemistry</i> , 273(37):23722-23728 (September 11, 1998)
AK	Lee, et al., "Lysophosphatidic Acid Stimulates the G-protein-coupled Receptor EDG-1 as a Low Affinity Agonist;" <i>The Journal of Biological Chemistry</i> , 273(34):22105-22112 (August 21, 1998)
AL	Lee, et al., "Sphingosine-1-Phosphate as a Ligand for the G Protein-coupled Receptor EDG-1;" <i>Science</i> , 279:1552-1555 (March 6, 1998)
AM	Lee, et al., "The Inducible G Protein-coupled Receptor edg-1 Signals via the Gi/Mitogen-activated Protein Kinase Pathway;" <i>The Journal of Biological Chemistry</i> , 271(19):11272-11279 (May 10, 1996)
AN	Lee, et al., "Vascular Endothelial Cell Adherens Junction Assembly and Morphogenesis Induced by Sphingosine-1-Phosphate;" <i>Cell</i> , 99:301-312 (October 29, 1999)

**EXAMINER**

**DATE CONSIDERED**

\*EXAMINER: Initial of reference considered, whether or not citation is in conformance with MPEP 609: Draw a line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.

FORM PTO-1449  
(REV. 7-85)U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE**INFORMATION DISCLOSURE CITATION**

(Use several sheets if necessary)

ATTY. DOCKET NO.  
4-31617A  
APPLICATION NO.  
TBA  
APPLICANT  
Liau, et al.  
FILING DATE  
June 24, 2003

Group

**OTHER DOCUMENTS** (Including Author, Title, Date, Pertinent pages, Etc.)

AA	Lee, et al., "Sphingosine 1-Phosphate Induces Angiogenesis: Its Angiogenic Action and Signaling Mechanism in Human Umbilical Vein Endothelial Cells;" <i>Biochemical and Biophysical Research Communications</i> , 264:743-750 (November 1999)
AB	Liau, G., "Angiogenesis - Potential Therapeutic Utility;" oral presentation presented October 6, 2000, at the IBC's Sixth Annual International Conference on Angiogenesis, October 5-6, 2000
AC	Liau, et al., "An Adenoviral Vector Expressing Sphingosine Kinase 1 Confers Enhanced Neovascularization;" abstract published June 26, 2001, 6th Biannual International Meeting, Angiogenesis: Basic Science and Clinical Developments, June 26 - July 2, 2001, Crete, Greece
AD	Liau, G., "Pro-angiogenesis Gene Therapy;" oral presentation presented June 29, 2001 at the 6th International Meeting Angiogenesis: Basic Science and Clinical Development, June 29, 2001
AE	Liau, et al., "An Adenoviral Vector Expressing Sphingosine Kinase 1 Confers Enhanced Neovascularization;" poster presented at the 6th Biannual International Meeting, Angiogenesis: Basic Science and Clinical Developments, June 26 - July 2, 2001, Crete, Greece
AF	Liu, et al., "Ligand-induced Trafficking of the Sphingosine-1-phosphate Receptor EDG-1;" <i>Molecular Biology of the Cell</i> , 10:1179-1190 (April 1999)
AG	Liu, et al., "The Mouse Gene for the Inducible G-Protein-Coupled Receptor edg-1;" <i>Genomics</i> , 43:15-24 (1997)
AH	Liu, et al., "Molecular Cloning and Functional Characterization of a Novel Mammalian Sphingosine Kinase Type 2 Isoform;" <i>The Journal of Biological Chemistry</i> , 275(26):19513-19520, published April 5, 2000
AI	Liu, Y., "Edg-1, the G Protein-coupled Receptor for Sphingosine-1-Phosphate, is Essential for Vascular Maturation;" <i>The Journal of Clinical Investigation</i> , 106(8):951-961 (October 2000)
AJ	Mandala, et al., "Molecular Cloning and Characterization of a Lipid Phosphohydrolase that Degrades Sphingosine-1-Phosphate and Induces Cell Death;" <i>PNAS</i> , 97(14):7859-7864 (July 5, 2000)
AK	Nava, et al., "Functional Characterization of Human Sphingosine Kinase-1;" <i>FEBS Letters</i> , 473:81-84 (May 2000)
AL	Offermanns, et al., "Vascular System Defects and Impaired Cell Chemokinesis as a Result of G $\alpha_{13}$ Deficiency;" <i>Science</i> , 275:533-536 (January 24, 1997)
AM	Olivera, et al, "Purification and Characterization of Rat Kidney Sphingosine Kinase;" <i>The Journal of Biological Chemistry</i> , 273(20):12576-12583 (May 15, 1998)
AN	Olivera, et al., "Sphingosine-1-Phosphate as Second Messenger in Cell Proliferation Induced by PDGF and FCS Mitogens;" <i>Nature</i> , 365:557-560 (October 7, 1993)

**EXAMINER****DATE CONSIDERED**

\*EXAMINER: Initial of reference considered, whether or not citation is in conformance with MPEP 609: Draw a line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.

FORM PTO-1449  
(REV. 7-85)U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE**INFORMATION DISCLOSURE CITATION**

(Use several sheets if necessary)

ATTY. DOCKET NO.  
4-31617A  
APPLICATION NO.  
TBA  
APPLICANT  
Liau, et al.  
FILING DATE  
June 24, 2003

Group

**OTHER DOCUMENTS** (Including Author, Title, Date, Pertinent pages, Etc.)

	AA	Panetti, et al., "Sphingosine-1-Phosphate and Lysophosphatidic Acid Stimulate Endothelial Cell Migration;" <i>Arterioscler Thromb Vasc Biol.</i> , 20:1013-1019 (April 2000)
	AB	Passaniti, et al., "Methods in Laboratory Investigation;" <i>Laboratory Investigation</i> , 67(4):519-528 (1992)
	AC	Pitson, et al., "Expression of a Catalytically Inactive Sphingosine Kinase Mutant Blocks Agonist-induced Sphingosine Kinase Activation: A dominant-negative Sphingosine Kinase;" <i>The Journal of Biological Chemistry</i> , 275(43):33945-33950, published on August 15, 2000
	AD	Pyne, et al., "Sphingosine 1-Phosphate Signalling in Mammalian Cells;" <i>J. Biochem.</i> , 349:385-402 (July 2000)
	AE	Sato, T., "A New Role of Lipid Receptors in Vascular and Cardiac Morphogenesis;" <i>The Journal of Clinical Investigation</i> , 106(8):939-940 (October 2000)
	AF	Spiegel, S., "Sphingosine 1-Phosphate: A Prototype of a New Class of Second Messengers;" <i>Journal of Leukocyte Biology</i> , 65:341-344 (March 1999)
	AG	Wang, et al., "Sphingosine 1-Phosphate Stimulates Cell Migration through a Gi-coupled Cell Surface Receptor;" <i>The Journal of Biological Chemistry</i> , 274(50):35343-35350 (December 10, 1999)
	AH	Xia, et al., "Activation of Sphingosine Kinase by Tumor Necrosis Factor- $\alpha$ Inhibits Apoptosis in Human Endothelial Cells;" <i>The Journal of Biological Chemistry</i> , 274(48):34499-34505 (November 26, 1999)
	AI	Yang, et al., "Sphingosine 1-Phosphate Formation and Intracellular Ca <sup>2+</sup> Mobilization in Human Platelets: Evaluation With Sphingosine Kinase Inhibitors;" <i>J. Biochem.</i> , 126:84-89 (July 1999)
	AJ	Ylä-Herttuala, et al., "Cardiovascular Gene Therapy;" <i>The Lancet</i> , 355:213-222 (January 15, 2000)
	AK	Zhang, et al., "Comparative Analysis of Three Murine G-protein Coupled Receptors Activated by Sphingosine-1-Phosphate;" <i>Gene</i> , 227:89-99 (February 1999)
	AL	
	AM	
	AN	

**EXAMINER****DATE CONSIDERED**

\*EXAMINER: Initial of reference considered, whether or not citation is in conformance with MPEP 609: Draw a line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.